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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/780,632	02/09/2001	Surinder M. Maini	HT-3765 US NA	9350

23906 7590 05/04/2004

E I DU PONT DE NEMOURS AND COMPANY  
LEGAL PATENT RECORDS CENTER  
BARLEY MILL PLAZA 25/1128  
4417 LANCASTER PIKE  
WILMINGTON, DE 19805

EXAMINER

BOYD, JENNIFER A

ART UNIT	PAPER NUMBER
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1771

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/780,632	MAINI, SURINDER M.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jennifer A Boyd	1771	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The Applicant's Amendments and Accompanying Remarks, filed February 11, 2004, have been entered and have been carefully considered. Claim 10 has been amended, claims 1 – 9 and 9 – 21 are cancelled and claims 10 – 18 are pending. In view of Applicant's amendment to claim 10 requiring that the yarn is "consisting essentially of" a co-mingled bundle of 10 to 90 weight percent para-aramid filaments and 90 to 10 weight percent meta-aramid filaments as result excluding the incorporation of thermoplastic polymers, the Examiner withdraws the previously set forth rejection as detailed in paragraph 3 of the previous Office Action dated October 15, 2003. Despite these advances, the invention as currently claimed is not found to be patentable for reasons herein below.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Objections***

3. Claim 17 is objected to because of the following informalities: the Applicant has misspelled "meta-aramid"; please amend. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

4. Claims 10 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behnke et al. (US 4,120,914) in view of Barbeau et al. (US 5,299,602) and Geirhos (US 5,879,800).

Art Unit: 1771

Behnke is directed to aromatic polyamide fiber blends for protective clothing such as protection for extreme temperature conditions such as that provided by exposure to burning fuel (Title and column 1, lines 15 – 30).

As to claims 10 and 16 - 18, Behnke teaches an intimate blend of aromatic polyamide staple fiber components comprising 45 – 55 weight percent poly(m-phenylene isophthalamide) fibers and 45 – 55 weight percent poly(p-phenylene terephthalamide) fibers (Abstract). The Examiner equates the poly(m-phenylene isophthalamide) fibers to Applicant's "meta-aramid" and the poly(p-phenylene terephthalamide) to Applicant's "para-aramid". It should be noted that yarns comprising 45 – 55 weight percent poly(m-phenylene isophthalamide) fibers and 45 – 55 weight percent poly(p-phenylene terephthalamide) fibers meet Applicant's weight percentage requirements of claim 18. Additionally, Behnke provides an example of a 50/50 blend (column 6, lines 50 – 55). Behnke teaches that the appropriate proportions of the aromatic polyamide staple components are blended and spun into yarns and woven into fabrics (column 6, lines 29 – 35).

As to claim 14, Behnke teaches that the woven fabric can have a plain weave construction (column 6, lines 55 – 65).

As to claim 15, Behnke teaches that the woven fabric can have a twill weave construction (column 6, lines 55 – 65).

As to claim 10, Behnke fails to teach that the yarn is multi-filament yarn.

Barbeau is directed to a textile material for an outer shell of a firefighter's garment (Title). Barbeau teaches a woven fabric where the warp yarns are made of multi-filamentary

Art Unit: 1771

aramid yarns while the wefts comprise alternate multifilamentary aramid yarns and spun aramid yarns (Abstract). Barbeau notes that typically outer shells in such applications are constructed of spun yarns. However, spun yarns do not slide easily on themselves or on surfaces inside or outside with which they come in contact. As a result, a certain amount of body energy is required to move in the garments or flex joints, and to otherwise perform functions associated with the job of the wearer. Additionally, the outer shell material must not fall below the minimum performance requirements. For example, a garment could be made lighter by employing a lighter weight outer shell fabric; the drop in weight would create lowered mechanical resistance. Barbeau teaches one method of overcoming the decrease in mechanical resistance as fabric weight decreases is to use filament instead of spun yarns. Barbeau notes filament yarns have a very high tensile strength and abrasion strength. Also, filament yarns are more slippery than spun yarns thereby reducing the friction between the filament fabric and any other fabric with which it may come in contact. This slipperiness increases the flexibility and mobility of the garment thereby reducing metabolic heat build-up (column 1, lines 15 – 45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the spun yarns form of Behnke with the filamentary yarns of Barbeau motivated by the desire to reduce fabric weight, increase mechanical resistance and increase flexibility and mobility of the woven fabric.

As to claim 10, Behnke in view of Barbeau fails to teach that the yarn has a random entangled loop structure.

Art Unit: 1771

Geirhos is directed to a low-shrinkage hybrid yarn comprising reinforcing filaments and matrix filaments for producing composites (Abstract). Geirhos teaches a hybrid yarn produced by intermingling or commingling techniques (column 2, lines 40 – 45) such as by air entanglement (column 5, lines 60 – 65). Geirhos teaches that the reinforcing filaments can be filaments composed of a multiplicity of materials (column 3, lines 8 – 12). Geirhos teaches that the reinforcing filaments can comprise aramids such as para-aramids (p-phenyleneisophthalamide) or poly(p-phenyleneterephthalamide)) and meta-aramids (poly(m-phenyleneisophthalamide) or poly(m-phenyleneterephthalamide)) (column 3, lines 33 – 39). Geirhos teaches that the hybrid yarns can be made into a woven fabric (column 8, lines 1 – 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to create the yarn of Behnke in view of Barbeau with a random entangled loop structure as suggested by Geirhos motivated by the desire to create a fully integrated yarn with superior mechanical properties.

As to claims 10 - 13, Behnke in view of Barbeau and Geirhos discloses the claimed invention except for the random entangled loop structure has a weight per unit length of the yarn being 3 to 25 percent higher as required by claim 10 and 10 to 18 percent higher as required by claim 11 than a continuous filament yarn having the same composition but no entanglement or loops, the yarn has a linear density of 200 to 1000 denier as required by claim 12 and the yarn has a linear density of 300 to 600 denier as required by claim 13. It should be noted that the proportion of random entangled loop structure and the linear density of the yarn are result effective variables. For example, the higher percentage of random entangled loop structure

Art Unit: 1771

present, the total fabric weight will decrease. As the linear density increases, the fabric becomes stronger. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a random entangled loop structure which has a weight per unit length of the yarn 3 to 25 percent higher as required by claim 10 and 10 to 18 percent higher as required by claim 11, the yarn has a linear density of 200 to 1000 denier as required by claim 12 and the yarn has a linear density of 300 to 600 denier as required by claim 13 since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the weight per unit length of the yarn proportions of entangled loop structure in order to create a light-weight, strong and properly heat resistant fabric.

Art Unit: 1771

*Response to Arguments*

5. Applicant's arguments with respect to claims 10 - 18 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

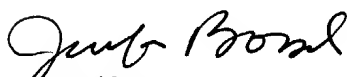
6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 571-272-1473. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jennifer Boyd  
April 21, 2004

  
**Ula C. Ruddock**  
Primary Examiner  
Tech Center 1700